DOCUMENT RESUME

ED 155 332 CE 016 143

AUTHOR	Kim, Jin Eun
TITLE	Development of a Cost-Effectiveness/Benefit Analysis Model and User's Manual for Postsecondary Vocational Programs. Final Report.
INSTITUTION	Indiana Univ., Bloomington. School of Education.
SPONS AGENCY	Indiana State Board of Vocational and Technical Education, Indianapolis.
PUB DATE	Oct 77
GRANT	SBVTE-13-76-C-5
NOTE	18p.; For related documents see CE 015 143-144 and ED 130 081-083
EDRS PRICE	MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS	*Cost Effectiveness; Evaluation Methods; *Input Output Analysis; *Models; Post Secondary Education; Program Costs; *Program Descriptions; *Program Development; Program Evaluation; *Vocational Education

ABSTRACT

This paper presents a brief final report of the system and products of the cost-effectiveness/benefit analysis project conducted at Indiana University which combined the two concepts of cost-effectiveness and cost-benefit analysis into a cost-effectiveness/benefit analysis model for postsecondary vocational programs. The project also developed data forms, a standard procedure for using the model, and an administrator's manual for conducting cost-effectiveness/benefit studies. The report summarizes objectives of the project, statement of the problem, priority areas, strategies and procedures, products from the project, evaluation, conclusions, recommendations, supplemental materials, and presents a final financial statement. (TA)

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FINAL REPORT

DEVELOPMENT OF A COST-EFFECTIVENESS/BENEFIT ANALYSIS MODEL AND USER'S MANUAL FOR POSTSECONDARY VOCATIONAL PROGRAMS

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October, 1977

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STATE OF INDIANA
STATE BOARD OF VOCATIONAL AND TECHNICAL EDUCATION

COST-EFFECTIVENESS STUDY PROJECTS

IN

VOCATIONAL EDUCATION

Project Director: Jin Eun Kim

1. *Development of A Cost-Effectiveness Analysis Model and Administrator's Manual for Secondary Vocational Programs: July 1, 1975 -- June 30, 1976.*

2. *Development of A Cost-Effectiveness/Benefit Analysis Model and User's Manual for Postsecondary Vocational Programs: July 1, 1976 -- October 31, 1977.*

3. *Diffusion of the Cost-Effectiveness Analysis System for Improving Secondary Vocational Program Management: January 1, 1977 -- December 31, 1977.*

4. *National Priority Training Project: Developmental Strategies and Evaluation Techniques for Improving the Cost-Effectiveness of Vocational Programs: July 1, 1977 -- June 30, 1978.*

PROJECT INFORMATION

Grantor State Board of Vocational and Technical Education
401 Illinois Bldg., 17 West Market Street
Indianapolis, IN 46204

Grant SBVTE Project Number: 13-76-C-5 (P.L. 90-576, Part C)

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The project reported in this publication was conducted under government sponsorship, and its author was encouraged to express freely his judgments in professional and technical matters. Points of view in the report do not necessarily represent policies of the funding agencies.

ABSTRACT

Purpose. The purpose of the project is to develop a cost-effectiveness/benefit analysis model and user's manual for post-secondary vocational programs. The specific objectives are: (1) to conceptualize cost-effectiveness/benefit analysis, (2) to develop a conceptual model, data forms, and a standard procedure for using this model, (3) to evaluate the model and data forms, and (4) to produce an administrator's manual.

Procedures. Based upon the reviewed literature, cost-effectiveness/benefit analysis is defined as an analytical, evaluative, and planning technique, and a tri-dimensional framework is formulated for evaluating postsecondary vocational programs. Within this framework, a cost-effectiveness/benefit analysis model is developed along with data forms and a standard procedure for using the model. The Project Advisory Committee has evaluated the products and advised how to simplify them for practitioners. Finally, the administrator's manual has been developed for guiding specific activities in conducting cost-effectiveness/benefit studies.

Products. The two major reports from the project are the technical report and administrator's manual, which are presented under separate cover as companions to this final report. The technical report synthesizes both cost-effectiveness and cost-benefit analysis concepts into a conceptual model for the cost-effectiveness/benefit analysis of postsecondary vocational programs. The model includes a set of program objectives and target goal statements and a program cost analysis scheme, and it generates three kinds of cost-effectiveness/benefit measures for program evaluation. It also includes a bibliography.

In conjunction with the model, the administrator's manual delineates the specific step-by-step activities in three phases: (1) planning a cost-effectiveness/benefit study, (2) implementing the study, and (3) utilizing the results from the study. This set of program objectives and target goal statements, data forms, and tables for computing cost-benefit measures are appendixed in the technical report and the administrator's manual. This final report summarizes the project and presents a financial statement.

INFORMATION SHEET

A. Kind of Project: (check one)

1	___ Experimental	4	___ Demonstration
2	X Developmental	5	___ Evaluative
3	___ Pilot	6	___ Exemplary

B. Population

TYPE		NUMBERS (affected by project)
A	Disadvantaged	A _____
B	Handicapped	B _____
C	Migrant	C _____
D	Minority	D _____
E	Combination of the above	E _____
F	Other _____	F _____

GROUP		
1	Pre-school	1 _____
2	Elementary	2 _____
3	Junior High School	3 _____
4	Middle School	4 _____
5	Senior High School	5 _____
6	Postsecondary	6 1,000(Administrators & Educators)
7	Adult	7 _____
8	University	8 _____
9	Employer	9 _____
10	Employee	10 _____
11	Citizens	11 _____
12	Parents	12 _____
13	Combination of the above _____	13 _____

LOCALITY (check the one which encompasses the locality involved)

a	National	a _____
b	State	b X
c	Region	c _____
d	District	d _____
e	County	e _____
f	Area	f _____
g	Community	g _____
h	School Corporation (LEA)	h _____

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DEVELOPMENT OF A COST-EFFECTIVENESS/BENEFIT ANALYSIS MODEL AND USER'S MANUAL FOR POSTSECONDARY VOCATIONAL PROGRAMS

This paper presents a brief final report of the system and products of the cost-effectiveness/benefit project which has been conducted at Indiana University with the financial support of the State Board of Vocational and Technical Education from July 1, 1976 to October 31, 1977.

This report summarizes: (1) objectives of the project, (2) statement of the problem, (3) priority areas, (4) strategies and procedures, (5) products from the project, (6) evaluation, (7) conclusions, (8) recommendations, (9) supplemental materials, and (10) financial statement. Detailed technical and procedural information is published under separate cover in a technical report and an administrator's manual.

Objectives of the Project

The purpose of the project is to develop a conceptual model and user's manual for cost-effectiveness/benefit analysis of post-secondary vocational programs. The specific objectives of the project are:

1. To conceptualize cost-effectiveness/benefit analysis for evaluating postsecondary vocational programs.

2. To develop a cost-effectiveness/benefit analysis model, data forms, and a standard procedure for using the model.

3. To evaluate the model and data forms to validate their use.

4. To prepare an administrator's manual as a guide to conducting cost-effectiveness/benefit studies.

Statement of the Problem

As the demand and support for vocational education programs increase, so does the need for a systematic analysis of the costs and benefits of the programs. To meet this need, cost-effectiveness analysis can be used by vocational educators and administrators to measure their programs' effectiveness and benefits against associated costs. As a model designed to facilitate the optimal utilization of limited resources, the analysis technique can provide decision-makers with a useful criterion for allocating resources among numerous competing programs in a rational way. In addition, the analysis is also of significant use in developing alternative vocational programs because it increases the analytical power of the planning, programming, budgeting system (PPBS).

However, the term cost-effectiveness analysis is still too ambiguous. Its potential is not fully developed conceptually or technically. The literature defines cost-effectiveness analysis in different ways and creates confusion by conceptualizing it as an analytical tool. An operational definition is needed for developing a cost-effectiveness analysis model and manual. There are a number of cost-effectiveness models made by Abt Associates (1969), Alkin (1970), and the Wisconsin R & D Center (1975). These models are useful for research studies on the input and output relationship among the components of the educational system; however, they are too sophisticated to be used in analyzing the cost-effectiveness relationship of vocational programs by practitioners. They are also lacking in the dimensions of specified program objectives and use of effectiveness as a measure of goal attainments.

During the past decade, research and evaluation reports on postsecondary vocational education programs have been done under the auspices of the U.S. Office of Education. Most efforts were given to a cost analysis and cost-benefit comparison of vocational programs. Attempts were neither made to measure the cost-effectiveness of post-secondary vocational programs nor to develop a cost-effectiveness/benefit analysis model for the programs.

Under such a circumstance, there was an acute need to develop a comprehensive model and manual for the cost-effectiveness/benefit analysis of vocational programs as a bridge between theory and practice. This project has focused research efforts on the practical need to develop a simplified model and analytical techniques to be used by practitioners.

Priority Area

This project is classified in category number three, innovative projects, as it appears in the FY 1976 Request for Prospectus developed by the Indiana State Board of Vocational and Technical Education.

This cost-effectiveness/benefit analysis model has been developed to provide useful information for making policy decisions regarding the evaluation and planning of postsecondary vocational programs. The administrator's manual is designed to facilitate self-evaluation studies and enables practitioners to use the model for analyzing cost-effectiveness/benefit of their postsecondary vocational programs.

Strategies and Procedures

Based upon the reviewed literature, cost-effectiveness/benefit is conceptualized to combine the two concepts of cost-effectiveness and cost-benefit analysis. A tri-dimensional framework is structured by program classification, criteria, and time frame for program evaluation.

A cost-effectiveness/benefit analysis model for postsecondary vocational programs is developed within the input-output framework. The primary effort is made to specify four major components and to generate three kinds of cost-effectiveness/benefit measures.

To evaluate the project, a Project Advisory Committee was organized to involve three deans responsible for administering vocational programs, three state administrative officers, and one university professor in vocational education. Through four meetings, they reviewed drafts and advised how to simplify the products for practitioners. Their suggestions were incorporated into the development of program objectives and target goal statements, program cost analysis scheme, and data forms. The project staff visited three different institutions and received appropriate information from field personnel.

In developing the administrator's manual, the primary effort was made to specify step-by-step activities which are needed for conducting cost-effectiveness/benefit studies. The manual is designed to provide postsecondary vocational administrators with self-instructional guidelines for analyzing the cost-effectiveness/benefit of their own programs.

Products from the Project

The two major products are (1) the technical report and (2) the administrator's manual, which are printed separately as companion reports to this final report. Some essential parts from these major products are briefly summarized as follows:

Definition. Cost-effectiveness/benefit analysis is defined as a technique for assessing the outputs of existing and/or new programs in relation to their specified program target goals and against the associated costs. The technique is viewed as a systems analysis, an evaluation method, and a planning tool for post-secondary vocational programs.

Tri-Dimensional Framework. A tri-dimensional structure is conceptualized for vocational program evaluation. The structure consists of the three dimensions of (1) program classification by degree level, (2) the criteria of effectiveness, efficiency, and performance, (3) a time frame for one-year completion, two-year graduation, and follow-up survey.

C-E/B Model. A cost-effectiveness/benefit analysis has been developed within the input-output framework. Social demand and support and student characteristics are considered as inputs to the school system, and economic and non-economic benefits for the society are viewed as long-term outcomes of the educational system. Four major components of the model are specified by (1) program classification, (2) program objectives, (3) program outputs, and (4) program costs.

C-E/B Measures. The model generates three kinds of cost-effectiveness/benefit measures: (1) program effectiveness, (2) cost efficiency, and (3) cost-effectiveness and performance ratio. Fifteen formulas are presented to compute these measures. Within the model, cost-benefit measures are viewed as external efficiency measures and the necessary tables are developed for computing the net present value, the cost-benefit ratio, and the internal rate of return.

Program Objectives and Goal Statements. The set of program objective and target goal statements has been developed to include five objectives: (1) enrollment, (2) career preparation, (3) placement and employment, (4) advanced studies, and (5) economic benefits. A number of target goals are specified in measurable terms for each objective.

Data Form for Determining Program Goals and Outputs. In accordance with the program objectives and target goal statements, a data form is designed to determine program goals and outputs pertaining to enrollment, career preparation, job placement, advanced studies, and long-term benefits.

Data Form for Program Cost Analysis. A simplified data form for analyzing and computing program direct and indirect costs has been made for practitioners to fill out appropriate figures and a computing procedure is presented in a form which is like an income tax return form.

Standard Procedure. A standard procedure is conceptualized for using the model and data forms. The procedure includes activities in these three phases: (1) planning a cost-effectiveness/benefit study, (2) implementing the study, and (3) utilizing the results from the study.

Administrator's Manual. Based upon the standard procedure, an administrator's manual has been developed to specify step-by-step activities in a systematic form. The manual summarizes the cost-effectiveness/benefit model for postsecondary vocational programs. It also provides specific activities which are necessary for conducting cost-effectiveness/benefit studies following the step-by-step procedures within the planning, implementing, and utilizing phases.

Evaluation of the Products

The C-E/B model and computing formulas were reviewed by the Project Advisory Committee members. They commented that the model is conceptually all right, but cost-benefit measures should be separated from cost-effectiveness measures for the reason that the cost-benefit analysis techniques might be difficult for practitioners to apply by themselves.

The committee reviewed the set of program objectives and target goal statements and program cost analysis scheme and suggested they by simplified so that practitioners can use them. Data forms for program goals and outputs determination and the program cost analysis scheme were finalized into simple forms following the advice given by the advisory committee.

To test the formulas and measures developed in the model, hypothetical data were used to measure program effectiveness, cost efficiency, and cost-effectiveness and performance ratio. Cost-benefit measures were tested separately from the cost-effectiveness measures.

Conclusions

This project attempts to combine the two concepts of cost-effectiveness and cost-benefit analysis into a cost-effectiveness/benefit analysis model for postsecondary vocational programs. It also develops data forms, a standard procedure for using the model, and an administrator's manual for conducting cost-effectiveness/benefit studies. With regard to these products, the following conclusions are drawn:

1. As a comprehensive framework, the proposed model specifies four major components and generates three relevant measures which will provide answers to program evaluation questions.

2. Using the program objectives and target goal statements, cost analysis scheme, and data forms as developed for the model, empirical data can be collected and analyzed to determine the program effectiveness, cost efficiency, and management performance of postsecondary vocational programs.

3. The resulting measures can be used as criteria in the decision-making process for program evaluation, development, and planning purposes.

4. As a standard procedure for using the model, nine steps are conceptualized within three phases: planning, implementation, and utilization.

5. The administrator's manual can be used by postsecondary vocational administrators and educators in conducting cost-effectiveness/benefit studies for their own program evaluation.

Recommendations

Although this project is concerned with the cost-effectiveness/benefit analysis of postsecondary vocational programs, the use of the products can be extended to the analysis of cost-effectiveness/benefit of all educational programs. The products also can be improved by cumulative research efforts. From this point of view, the following recommendations are made:

1. Even though the model has focused upon postsecondary vocational programs, the basic concepts and technical procedures can be extended to the evaluation of all educational programs if program objectives are appropriately specified.

2. In determining program objectives and target goals, student and community characteristics information should be fully considered and the concerned people should be involved in determining target goals and in interpreting the results.

3. The resulting cost-effectiveness/benefit measures should be used as evaluating criteria in the decision-making process, and the analysis should be continued as a recurrent process for program planning, implementation, and evaluation.

4. To facilitate the implementation of cost-effectiveness/benefit analysis, further efforts should be given to pilot studies for demonstration and to dissemination conferences in which vocational administrators can participate.

5. Additional research will be needed for determining program objectives, standardizing cost analysis, and computing cost-effectiveness/benefit measures. Based upon future research efforts, the model and manual will be improved for more general use.

Supplemental Material

The major products from the project are presented as the technical report and administrator's manual. The technical report specifies components of the cost-effectiveness/benefit analysis model which generates three kinds of cost-effectiveness/benefit measures for evaluating postsecondary vocational programs. The administrator's manual provides step-by-step activities which are necessary for conducting cost-effectiveness/benefit study. The set of program objectives and target goal statements, data forms for target goals determination and program cost analysis, and tables for computing cost-benefit measures are appendixed both in the technical report and the administrator's manual.

FINAL FINANCIAL STATEMENT

Project No. 47-421-70
13-76-C-5

ITEMS	Project Budget FY 19--		Total Expenditures on Project		End of Project Balance	
	Agency	Federal	Agency	State/ Federal	Agency	State/ Federal
A. DIRECT EXPENDITURES						
1. Personnel		$14,500.00		$14,500.00		-------
2. Contractual services		1,722.00		1,846.25		-$124.25
3. Employee benefits		1,776.00		1,617.72		158.28
4. Travel		1,024.00		597.77		426.23
5. Supplies and materials		428.00		693.78		-265.78
6. Communications (include phone calls, printing)		200.00		230.69		-30.69
7. Properties (rentals or purchase of equipment)		-------		-------		-------
8. Facilities		-------		-------		-------
9. Product production and dissemination		350.00		510.00		-160.00
10. Project Evaluation		-------		-------		-------
B. INDIRECT EXPENDITURES	$8,440.00		$8,438.40		$ 1.60	
C. TOTAL EXPENDITURES	$8,440.00	$20,000.00	$8,438.40	$19,996.21	$ 1.60	* $ 3.79

Fiscal Agent/Director: Jim Ellis Kim

Institution/Agency Name: *Indiana University-Bloomington*

* Refund this amount to the State Board of Vocational and Technical Education